

WEEK 10

DAY 1: CYBER ARCADE & EVENT PLANNING



INTRODUCTION

This is the last session makers have to continue working on their interactive Cyber Arcade projects. They'll prepare their projects to share in a community Cyber Arcade event for the next session!



ESSENTIAL QUESTIONS

- What is a game or interactive project we want to share with our community?
- What changes do we need to make to our project to be ready for the Cyber Arcade?
- How do artists, engineers, and makers solve problems when they're working?



LEARNING OUTCOMES

1. Engage in project-based learning through problem-solving and troubleshooting by creating a game using a Micro:bit microcontroller and code.
2. Build, test, and complete interactive projects for a community event.



VOCABULARY

Project planning: Process of clarifying goals and listing the steps and materials required to complete a project

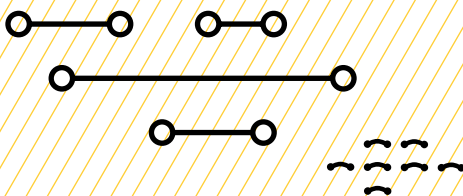
Game mechanics: Basic actions, processes, visuals, and control mechanisms that are used to make a game

Game designer: Person responsible for designing game storylines, plots, objectives, scenarios, the degree of difficulty, and character development

Game engineer: Specialized software engineers who design and program video games

Pseudocode: Detailed, informal description of what a computer program must do

Troubleshooting: Using resources to solve issues as they arise





MATERIALS LIST

EACH PAIR OF MAKERS NEEDS:

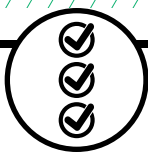
- Micro:bit microcontroller
- External battery pack
- AAA batteries (2)
- Laptop with internet connection
- USB to micro-USB cord
- USB flash drive
- Notebook
- Markers
- Colored pencils
- Scissors
- Cardboard scissors

ALL MAKERS NEED ACCESS TO:

- Alligator clips
- Alligator-to-pin wires
- Buttons (momentary and locking)
- Servos
- Tape (masking, painters, duct)
- Aluminum foil
- Assorted cardboard
- Assorted paper
- Pipe cleaners, pom-poms, popsicle sticks
- Misc bottle caps/recycling (optional)
- Hot glue gun and glue sticks (see [Facilitation Tips](#))

Items can be portioned out per table or set up in an area where students can access them freely.





TEACHER PREP WORK

1. Set up an equitable system for student access of materials (either as a materials area or distributed evenly per table).
2. Set up a hot glue station covered with newspaper or butcher paper.
3. Print and cut copies of the [Project Checklist](#) (1 slip for each group).
4. Print out copies of the [Cyber Arcade Project Description](#) (1 for each group, plus extras).
5. Print the [Troubleshooting Tips](#) and post in the classroom.

FACILITATION TIPS

Inspiring creativity: To build excitement for the Cyber Arcade, invite external community members (students, staff, parents, etc.) if possible. Having an authentic audience makes the experience of sharing their hard work more fun and significant. This week, makers may be at a point of wanting to decorate their projects or create props to make the experience more exciting and fun. If possible, help organize and acquire additional materials when appropriate.

Safety: Using hands-on tools is an empowering part of this curriculum. However, practicing safety when working is crucial when using hot glue and sharp tools. You know your makers best, so make adjustments

and adaptations as necessary.

If makers misuse any tools, have them take a break from the tool and return at your discretion.

Managing technology, electronics, and making: Part of the excitement of this project is the combination of using computers, code, electronics, and hands-on making materials together. Remind makers to clean up their work areas as they go. It may be helpful to circulate around the room to remind makers to establish work zones and help clear cardboard and recycling around groups as they work.

Collaboration: Ensure that all makers participate in all aspects of the project (coding, designing, and making). Often makers will stick with an area they're comfortable in. While acknowledging their particular skill in one area, use pair programming as needed to switch roles or have makers switch roles at least once in the session. Encourage makers to stretch out of their comfort zone to gain more experience with the other areas they're less comfortable in.

ADDITIONAL RESOURCES

[Micro:bit Game Design with Conditionals](#)

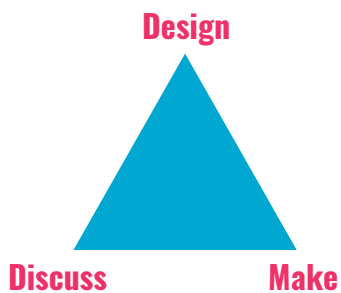
[Wonderful Idea Co.: Computational Carnival](#)



CYBER ARCADE & EVENT PLANNING

STEP 1

Complete a Project Checklist.



Makers reflect on where they left off in the last session and discuss what they need to do today in order to be ready for the Cyber Arcade event.

EXPLAIN

This is the last session you and your partner have to complete your projects before we present and share our work in the interactive Cyber Arcade event. In our next session, we'll set up and host our Cyber Arcade and experience each other's projects!

Depending on how far along your project is, you may have to simplify or add to your project to meet the deadline. You can also work on making your project more presentable by decorating or creating signs and props. You and your partner will go through a project checklist to make sure you have completed all the steps to be ready to present. If you still have work to do on the list, make sure you and your partner work together to complete it today.

Give each group a printed Project Checklist slip they can fill out together and tape into their notebook.

PROJECT CHECKLIST

- ☐ Coding is complete, tested, and saved onto the USB flash drive.
- ☐ Code is successfully uploaded to the Micro:bit.
- ☐ Test connections to the Micro:bit (servos, buttons, switches, batteries, speakers) and secure with tape, pipe cleaners, or zip ties where necessary.
- ☐ Cardboard construction is complete and sturdy.
- ☐ Surface decorations, signs, and props are complete.

STEP 2

Time to make.



This block of time is for makers to complete any work on their projects. Depending on how far along makers are, they may need to simplify their project in order to finish, or they may be done and want to add more surface decorations. Groups that are finished can help other groups or make signage or decorations for the event, using the maker supplies.

Make sure every group has enough space to safely work on coding and making.

- Circulate around the room and facilitate safe working habits by celebrating safe behaviors and calling attention to any unsafe behaviors (see Facilitation Tips).
- Assist with troubleshooting issues related to coding, electronics, and building with cardboard only after makers have tried on their own for some time, and after they've asked classmates.
- Give suggestions on what parts to edit out or prioritize in order to have a project to present in the next session.
- Help students with making cuts on their cardboard if you're comfortable with using the box cutter (see Facilitation Tips).
- If makers get frustrated or express conflict, point out when they should stop making to discuss and redesign as needed.

STEP 3



Fill out the Project Description and plan the event.

Hand out the [Cyber Arcade Project Description](#) forms (1 per team). Makers will fill these out to display alongside their projects at the event.

CYBER ARCADE PROJECT DESCRIPTION

Welcome to our Cyber Arcade! Our game is called:

Here is how you play our game:

This is how we coded our game:

INPUTS	OUTPUTS
<input type="text"/>	<input type="text"/>

Here are some cool things we used in our game (switches, servos, etc.):

Thank you for coming to our Cyber Arcade! (Add maker's names below.)

_____ and _____

EXPLAIN



Each of the games will be set up in the room just like a real arcade. People will walk in and need to know how to play your games without you necessarily being right there. You and your partner will fill out this project description and place it next to your game so that people can read to learn more about your game.

You can create additional signs or props today as well. At the start of the next session, we'll decorate and transform the space into a Cyber Arcade!

STEP 4



Clean up.

Makers will:

- Disconnect the battery pack.
- Put supplies and technology in their assigned bins.
- Return laptops and plug them in for charging.
- Return tools and materials that can be used again to the right place.
- Clear tables of garbage and recycling.

WEEK 10**DAY 2: CYBER ARCADE EVENT DAY****INTRODUCTION**

In this final session, makers host the Cyber Arcade event! Inviting members of the community to come participate is a great motivator and creates a genuine experience for makers to share their work with an audience.

**ESSENTIAL QUESTIONS**

- What is a game or interactive project we want to share with our community?
- How do we prepare for a community event?
- How do artists, engineers, and makers solve problems when they're working?

**LEARNING OUTCOMES**

1. Participate in an interactive community event.
2. Engage in project-based learning through problem-solving and troubleshooting by creating a game using a Micro:bit microcontroller and code.



VOCABULARY

Project planning: Process of clarifying goals and listing the steps and materials required to complete a project

Brainstorm: To think about something and try to come up with many ideas or solutions, either on your own or in a group

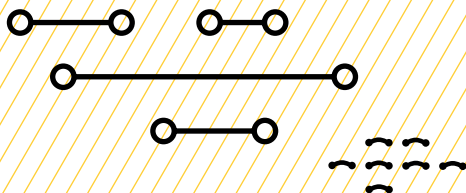
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MATERIALS LIST

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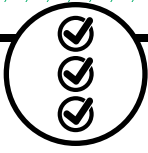
- Micro:bit microcontroller
- External battery pack
- AAA batteries (2)
- Laptop with internet connection
- USB to micro-USB cord
- USB flash drive
- Notebook
- Markers
- Colored pencils
- Scissors
- Cardboard scissors

ALL MAKERS NEED ACCESS TO:

- Alligator clips
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- Buttons (momentary and locking)
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- Tape (masking, painters, duct)
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- Hot glue gun and glue sticks (see [Facilitation Tips](#))

Items can be portioned out per table or set up in an area where students can access them freely.





TEACHER PREP WORK

1. Arrange the room and furniture to host a community event.
2. Set up an equitable system for student access of materials (either as a materials area or distributed evenly per table).
3. Set up a hot glue station and/or box cutter station, covered with newspaper or butcher paper.
4. Print the [Troubleshooting Tips](#) at the end of the lesson and post in the classroom.
5. Print extra copies of the [Cyber Arcade Project Description](#), in case anyone needs a new one.

FACILITATION TIPS

Inspiring creativity: To build excitement for the Cyber Arcade, invite external community members (students, staff, parents, etc.) to arrive at a specific time, giving makers enough time to set up and prepare. Having an authentic audience makes the experience of sharing their hard work more fun and significant. Makers who are finished with their projects can help move furniture and decorate

the space. Providing some special snacks, such as popcorn and gummy bears, can add excitement.

Safety: Refer to safety notes for Day 1. With the intensity of a final presentation and event, some makers may get nervous or stressed. This is the time to be extra careful and avoid accidents, especially with wiring and cords around the room. Remind makers to be super safe and mindful of each other.

Managing technology, electronics, and making: Part of the excitement of this project is the combination of using computers, code, electronics, and hands-on making materials together. Remind makers to clean up their work areas as they go. It may be helpful to circulate around the room to remind makers to establish work zones and help clear cardboard and recycling around groups as they work.

ADDITIONAL RESOURCES

[Micro:bit Game Design with Conditionals](#)

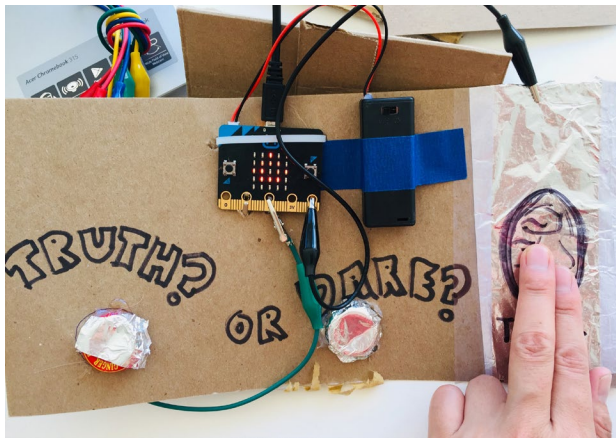
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CYBER ARCADE EVENT DAY

STEP 1 15 MINUTES

Set up the Cyber Arcade.



This is the time for makers to make any last-minute changes and set up their projects before the event starts. They should make sure they've completed the [Cyber Arcade Project Description](#) and put it next to their project.

Set up the room in a way that safely allows the flow of visitors and transforms the space to feel exciting. Makers who are finished and ready can help decorate the space with streamers, balloons, etc. Give makers specific tasks or roles for the event.

EXPLAIN



You have 15 minutes to make any final touches and set up your projects for the arcade! Don't worry if

your project is not as far along as you had hoped. We have worked so hard and explored so many high-level skills! If you're finished with your project, you can help set up the space with decorations or practice how you'll interact with the visitors.

STEP 2 30 MINUTES

Run the Cyber Arcade.



Makers present and share their work with community members. This may be done in group presentation fashion, where each group presents their work to the audience for the first 15–20 minutes.

Then, after each group has presented, everyone can circulate in the space freely for the next 10–15 minutes, interacting with each project.

When makers present, have them share the following:

1. Explain what their project is and how it works.
2. Share the challenges they worked through together in their coding and making.

STEP 3



Share shout-outs and reflections.

Congratulate makers on their hard work and perseverance in creating and running the Cyber Arcade. Remind makers that they can use MakeCode on any computer with an internet connection to continue exploring and making. Take a few minutes for makers to give shout-outs to their peers and reflect.

1. Who would like to give a shout-out to? Did anyone help you or inspire you throughout this project?
2. If you were going to do this project again, what would you like to add or do differently?

STEP 4



Clean up.

Makers can remove technology (Micro:bit, buttons, alligator clips)

and keep the cardboard structures or anything made with consumable materials.

Makers will:

- Dismantle their projects and return supplies and materials to the appropriate place.
- Return tools and materials that can be used again to the right place.
- Put away technology and make sure laptops are charging.
- Clear tables of garbage and recycling.

SAFETY AGREEMENT

1. Take care when walking with scissors or sharp things (hold with point facing down).
2. One maker at a time per tool prevents accidents.
3. Be mindful of space from others when using tools.

GLUE GUN SAFETY

1. Only 1 or 2 makers at the hot glue station at a time.
2. Don't touch the tip of the glue gun.
3. Don't point the glue gun at another person.
4. Work at the protected glue gun station.
5. Keep the glue gun close to your work.
6. If the glue gun jams, ask an adult for support.



TROUBLESHOOTING TIPS

The board isn't showing what we coded.

File version check

- Check to see that you uploaded the most recent copy of the code.
- Resave the latest version and drag and drop onto the Micro:bit.

The code isn't doing what we expected.

Check for bugs

- Read through the code.
- Read it out to a friend.
- Check to see if there are extra blocks that aren't supposed to be there.

The LED on the Micro:bit isn't flashing when we click Upload.

Bad cable or port

- If the Micro:bit isn't showing up in the computer menu, try a different cable.
- Try a different USB port on the laptop.

Our code isn't uploading correctly to the board. The board feels hotter than usual.

Burnt board

- Try pressing the reset button on the board.
- Try uploading to a new Micro:bit board.

Our board isn't turning on when connected to the battery pack.

Battery

- Check the batteries to see if they're charged.
- Check to see if the batteries are flipped.

TROUBLESHOOTING TIPS

Print and use the empty rows to fill in with other problems and solutions that can be shared.

PROJECT CHECKLIST

Print out (4 per page), cut out, and give one slip to each group.

PROJECT CHECKLIST

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